



City of Frisco, Texas **2006 COMPREHENSIVE PLAN**

Chapter 6: *Transportation Strategy*

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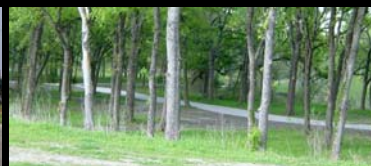




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2006 COMPREHENSIVE PLAN

“Streets and their sidewalks, the main public places of a city, are its most vital organs.”

- Jane Jacobs, *Life & Death of the Great American Cities*

Introduction

A City's transportation system should provide safe and efficient movement utilizing a comprehensive network of streets that complement land uses. In addition to handling current and future congestion, a City's transportation systems should be both livable and sustainable. Creating a “livable” transportation environment means providing an area that is more “people-centric” than “auto-centric.” Creating a “sustainable” transportation environment refers to ensuring that the system remains effective over time and limits adverse environmental impacts.

To ensure that Frisco's transportation meets these livability and sustainability ideals as the system is expanded, a number of challenges must be addressed. First, the transportation needs of residents, commuters, and visitors must be served in lieu of increasing numbers of commercial, industrial, and residential developments. Second, fossil fuel depletion and the emerging energy crisis affect transportation choices, personal finances, and the economic bottom line of both the City and its citizenry. Energy costs will increasingly become a determining factor in designing transportation systems. Third, the Dallas/Fort Worth region failed the Environmental Protection Agency's National Ambient Air Quality Standards (NAAQS), which resulted in the region being classified as a “non-attainment” zone. As an incentive to reach NAAQS, the Federal Government mandated that the Dallas/Fort Worth region comply by the year 2010 in order to be eligible to receive federal funding for transportation improvements. Failure to comply will result in severe sanctions, including the potential loss of hundreds of millions in federal highway transportation dollars.

In response, the City of Frisco is partnering with other municipalities in the region, Denton and Collin Counties, and the North Central Texas Council of Government to find ways to improve air quality. All of these challenges lead to the need for a system that is less focused on the automobile, but also on alternative modes of transportation as viable options for mobility.

Chapters One through Four establish the foundation for the *Transportation Strategy*. The *Snapshot* (Chapter 1) provides existing mobility conditions and projected traffic congestion, establishing the need for reevaluating transportation investments. The *Visioning Process* (Chapter 2) provides insight into what issues should be at the forefront of the *Transportation Strategy* from the perspective of the CPAC and the general public. The guiding *Principals & Actions* for the Transportation Strategy are generalized from Chapter 3 as follows:

- ❖ Ensure that the City's transportation system is cost-effective and adequate to meet the needs of the current and projected population;
- ❖ Ensure that transportation systems are appropriately designed for different development types;



- ❖ Identify ways to integrate alternative modes of transportation; and,
- ❖ Work with adjacent cities, county, and state governmental entities on efforts to maintain and/or expand the transportation system.

The *Transportation Strategy* chapter is organized into four sections. The first section outlines the existing transportation system. The second section provides a new transportation strategy—an integrated street, transit, pedestrian, and bicycle trail system; this section also compares the results of the modeling effort based on the 2000 land use and thoroughfare plan with the 2006 land use and thoroughfare plan. The third section discusses the importance of modes of transportation other than the automobile—specifically transit and hike and bike trails. And finally, the fourth section outlines the policies that provide a framework to guide decision-making as transportation projects are proposed.

Existing Transportation System

Street Hierarchy and Functional Classification

Frisco has an extensive roadway network that serves various land uses. The roadway system consists of a variety of roadway classifications ranging from major thoroughfares that serve high volume and higher speed traffic to local and collector streets that provide increased access to residences and commercial areas. The Dallas North Tollway (DNT) and Preston Road accommodate regional and local traffic, serving as major regional roadways that traverses the City. The hierarchy of streets, based on function, is described below.

- **Highway and Tollway.** Limited access roadway designed for high speed, long distance travel, and large traffic volumes. Tollways and highways are the jurisdiction of regional, state and federal agencies.
- **Major thoroughfare.** Relatively high-speed, long-distance surface streets designed to move large volumes of traffic across an urbanized area and to provide access to a highway and/or tollway.
- **Minor thoroughfare.** Medium-speed, moderate-capacity surface street used primarily to move traffic to and from residential areas, places of employment, retail, and entertainment venues.
- **Collector (Residential and Commercial).** A relatively low-speed, low-volume street used for neighborhood and commercial circulation and access to private property. Also, used to collect traffic from local streets and distribute to the thoroughfare system.
- **Local.** A low speed, low volume roadway primarily providing access directly to residences. Provides multiple driveways and on-street parking.

Figures 6-1 through 6-6 show the list of roadway classifications with the respective typical section as shown in City of Frisco *Thoroughfare and Circulation Design Requirements*.

Figure 6-1
MAJOR THOROUGHFARE

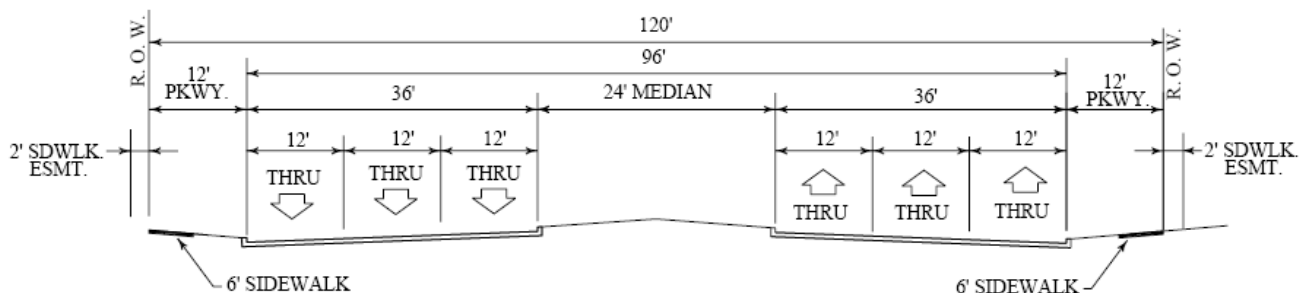


Figure 6-2
MINOR THOROUGHFARE

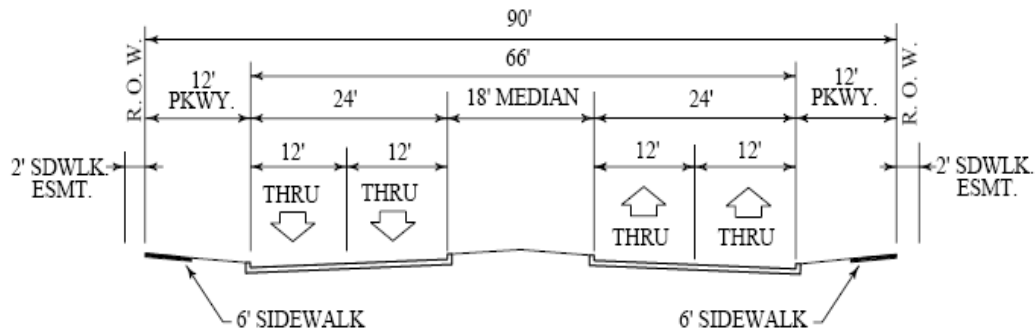


Figure 6-3
COLLECTOR (COMMERCIAL AND RESIDENTIAL)

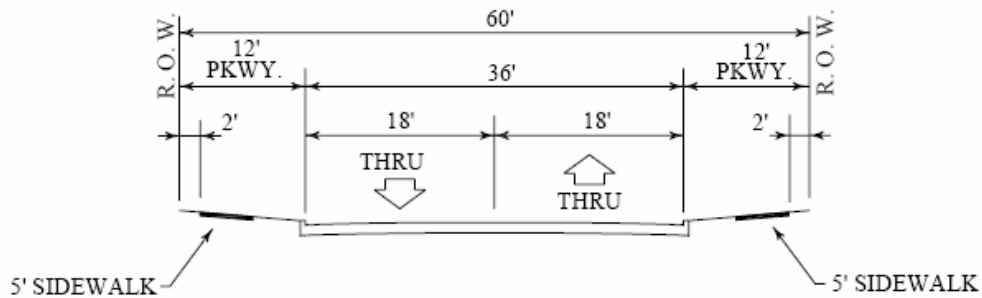


Figure 6-4
LOCAL 'E'

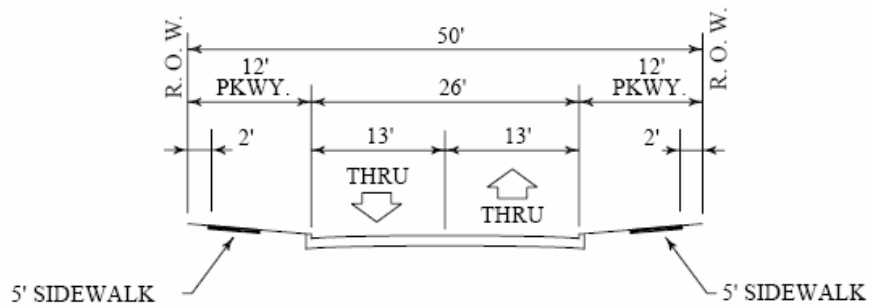




Figure 6-5
LOCAL 'F'

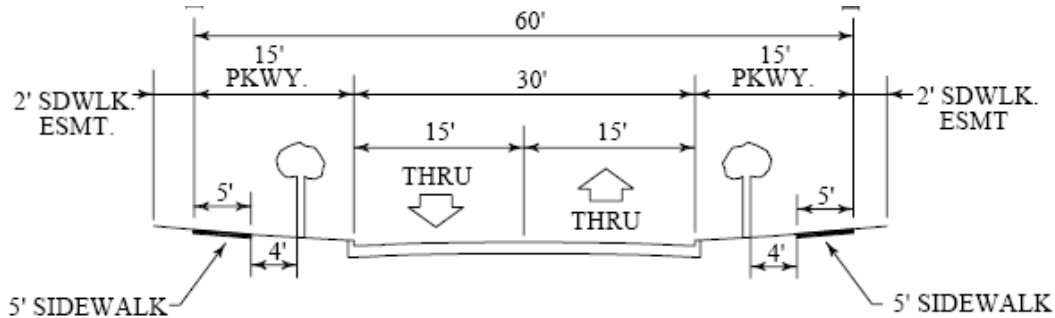
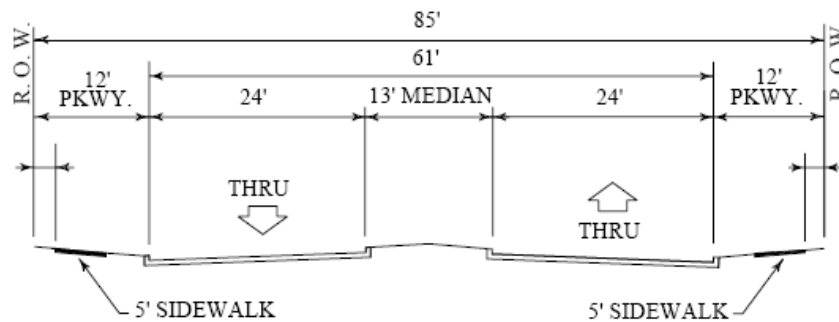


Figure 6-6

DIVIDED RESIDENTIAL SUBDIVISION ENTRANCE



OBSERVATIONS ABOUT FRISCO'S STREET SYSTEM

Frisco's roadway network generally provides a conventional grid system of major thoroughfares. The roadway system is organized such that most vehicle trips require the use of major thoroughfares. Therefore, in many instances, desired trips between residences and local stores requires passing through an intersection of two major thoroughfares. The DNT, Preston Road, Custer Road, and F.M. 423 serve major north-south regional and local traffic through the City. The following sections begin to look at transit service and existing mobility throughout the City.



Existing Transit System

The City contracts with Collin County Area Rapid Transit (CCART) for bus service transportation for the citizens of Frisco. This service consists of a free bus transportation that currently includes a fixed route of 12 stops within Frisco (see *Figure 6-7*, page 6.7). It should be noted that this route is subject to change. Bus service also includes curb-to-curb service upon request at a cost of between two and four dollars. Denton County Services Program for Aging Needs (SPAN) also provides curbside pickup upon request.



Existing Mobility

The City of Frisco has experienced tremendous growth over the past 10 years. Having a transportation system that can accommodate this growth is a major challenge. The City needs to remain vigilant in building and financing new roads. This section examines the current roadway system and the mobility implications of the 2000 Comprehensive Plan.

To evaluate current policies it is necessary to understand how the existing transportation system is functioning. The information presented below compares the current roadway transportation system with the mobility that would be provided by completion of the 2000 Comprehensive Plan. The comparison provides a benchmark to evaluate the proposed 2000 Comprehensive Plan and redirect transportation policies and planning efforts to ensure an efficient transportation system is created.

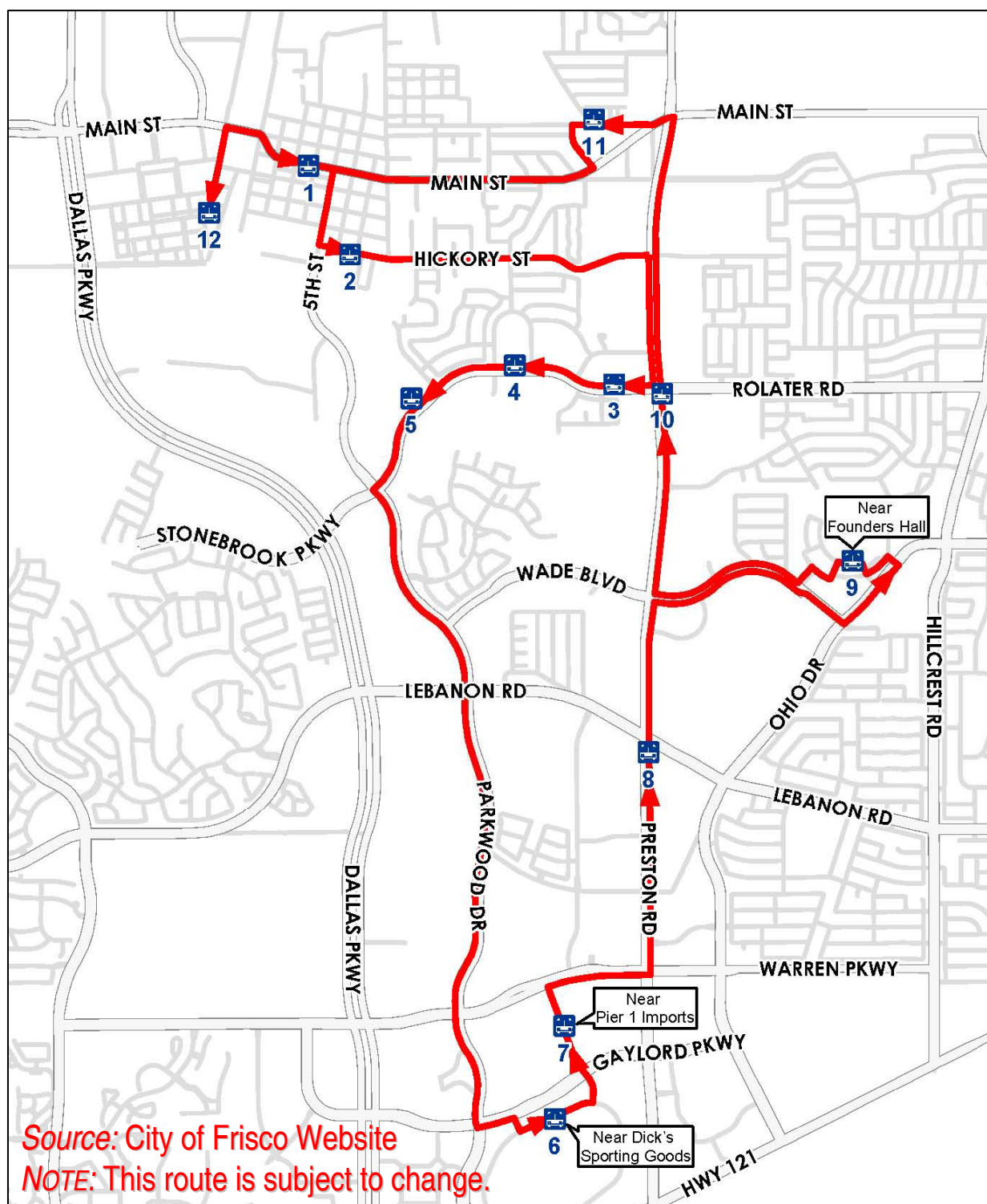
Three primary indicators measure the mobility of the transportation network which are outputs of the TransCAD model:

1. Vehicle Miles Traveled (VMT),
2. Vehicle Hours of Delay (VHD), and
3. Vehicle Hours Traveled (VHT) are indicators that measure

The following information represents descriptions of the outcome of the TransCAD modeling. Specifically, what the demands were on the transportation network for the year 2000, and what the demand would be in the year 2025 based on completion of the 2000 Comprehensive Plan (as it was adopted). More in-depth analysis of the modeling of the 2000 Comprehensive Plan and what the transportation implications would be in 2025 is provided in the *Snapshot of the City*, Chapter 1, beginning on page 1.49.



Figure 6-7
COLLIN COUNTY AREA RAPID TRANSIT (CCART) BUS SERVICE ROUTE WITHIN FRISCO



VEHICLE MILES TRAVELED

Vehicle Miles Traveled (VMT) is the distance traveled by all automobiles throughout the City. According to *Figure 6-8*, VMT will triple in the next 25 years, based on current development patterns and the implementation of the 2000 Comprehensive Plan.

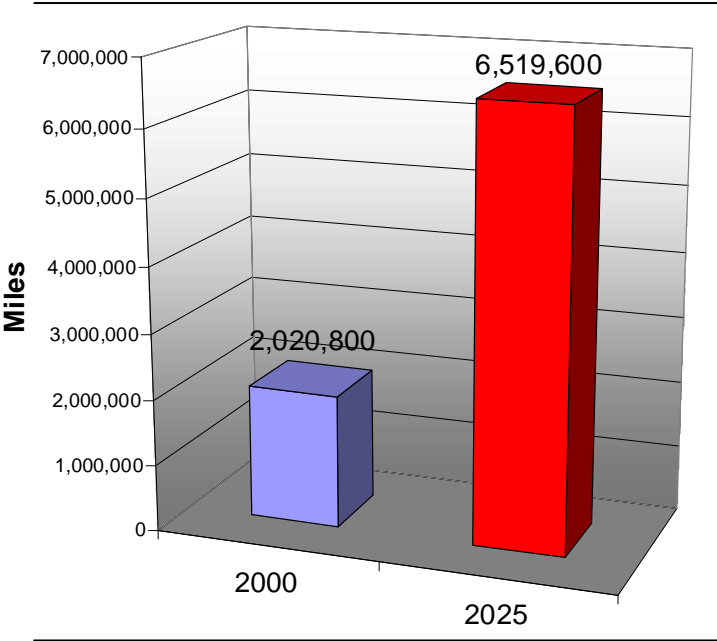
VEHICLE HOURS OF DELAY

Vehicle hours of delay is a transportation indicator that estimates the hours spent in congestion by vehicles. *Figure 6-9* shows a comparison of vehicle hours of delay in years 2000 and 2025. The model results showed that overall vehicle delay would increase by approximately 74 percent.

VEHICLE HOURS OF TRAVEL

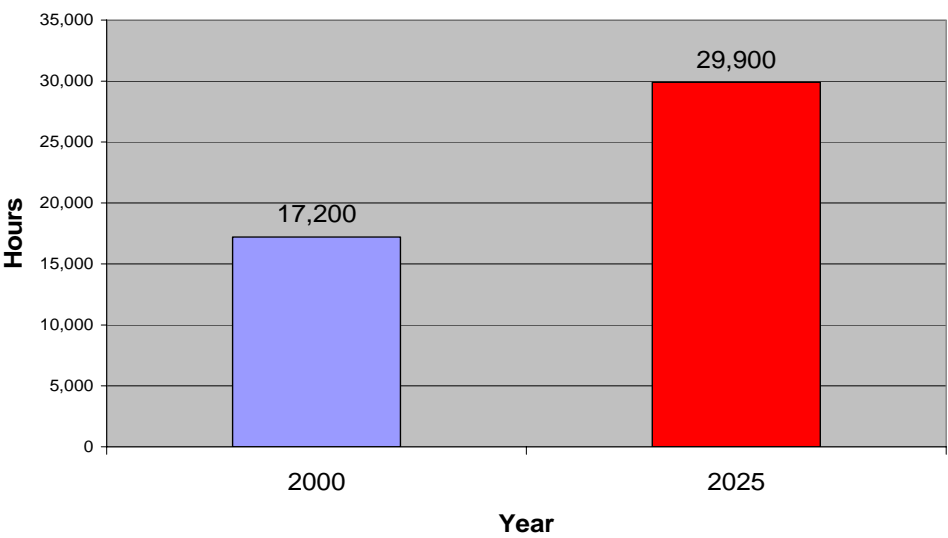
Vehicle hours of travel demonstrate the hours spent on the road by vehicles. *Figure 6-10* (page 6.9) shows the comparison of years 2000 and 2025. The result is an increase of approximately 180 percent in automobile hours traveled in 25 years, based on the current development patterns and the 2000 Comprehensive Plan.

Figure 6-8
VEHICLE MILES TRAVELED



Source: City of Frisco TransCAD Model

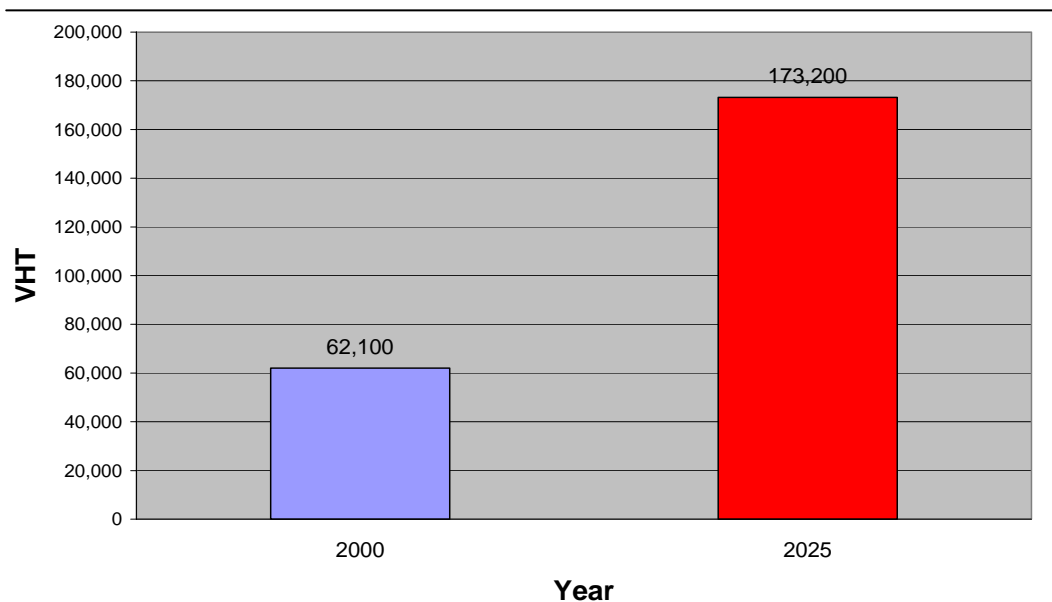
Figure 6-9
TOTAL AUTOMOBILE DELAY



Source: City of Frisco TransCAD Model



Figure 6-10
TOTAL AUTOMOBILE HOURS TRAVELED



Source: City of Frisco TransCAD Model

OBSERVATIONS ABOUT MOBILITY IN THE CITY

The transportation indicators shown above reveal that the existing transportation system is experiencing high amounts of delay and subsequent congestion. The roadway network will have difficulty meeting the future transportation needs of the City with implementation of the 2000 Comprehensive Plan. It should be noted, however, that the City did not have the foresight available then that it now has from the TransCAD model. Currently, Frisco is heavily dependent upon automobiles as the primary mode of transportation. The results of the traffic model showed that additional travel lanes alone will not correct the anticipated challenge of congestion. Widening of the roadways is necessary to avoid grid-lock, but other techniques such as mixing uses to shorten trip length, incorporating regional rail, and adding more hike and bike facilities will be necessary.

The following sections discuss new strategies to guide the City's transportation planning focus in a manner that is responsive to the principles and actions outlined in Chapter 3 and that is responsive to current and anticipated future transportation needs.





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The Transportation Strategy

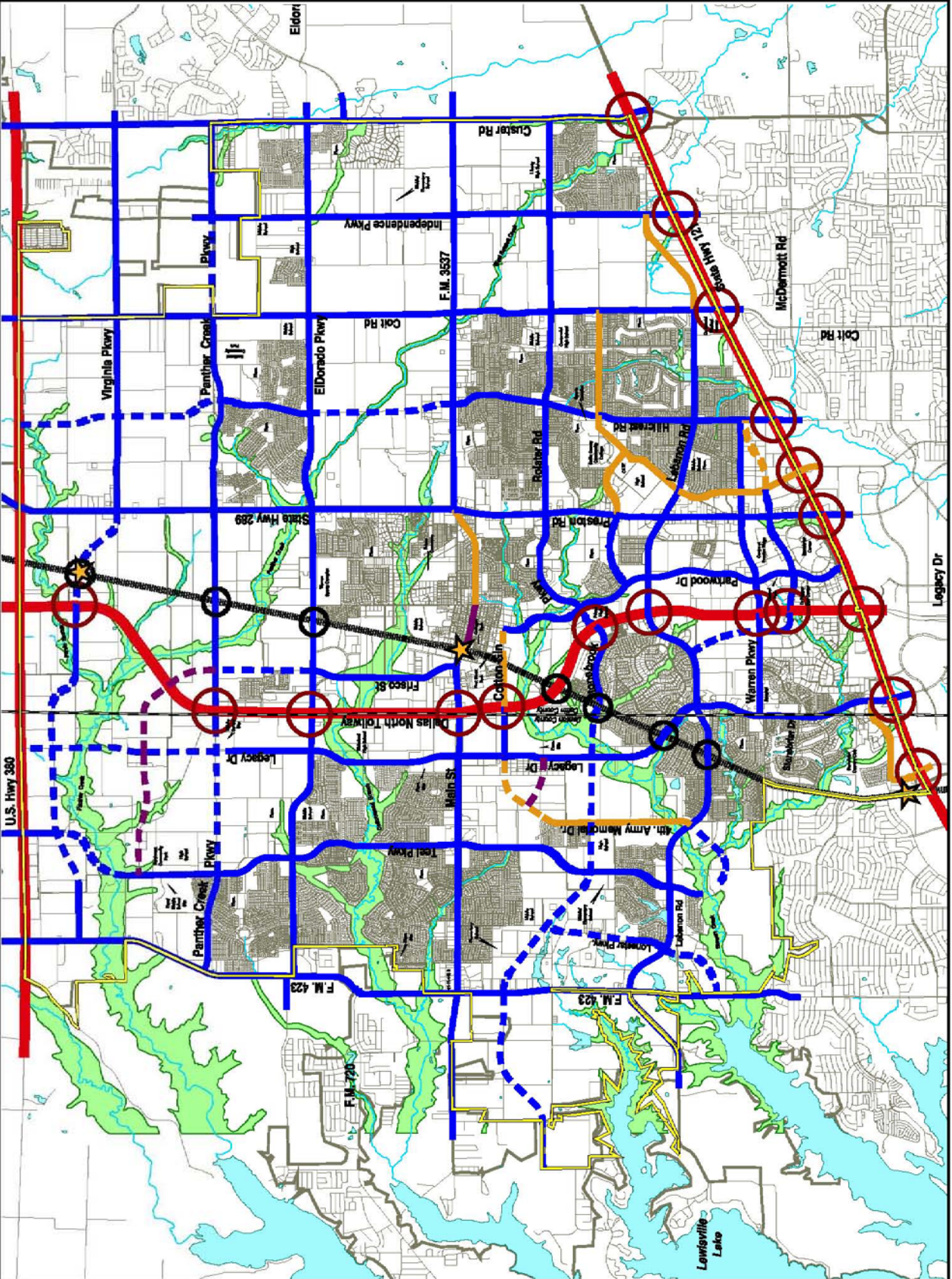
Land use planning generally guides the development of private property outside of the public right of way. Transportation planning primarily addresses the public infrastructure of streets and transit services, but also often puts forth tools and strategies that affect how private development contributes to the transportation system. Transportation planning affects physical improvements, such as the construction of streets, as well as less tangible elements, such as tools to reduce travel demand or automobile speed. This *Transportation Strategy* section sets forth the basis for both of these. A foundation for physical improvements is provided with components such as the *Future Thoroughfare Plan* (Plate 6-1 on the following page) and the proposed street sections, and for the less tangible elements with discussions about concepts such as urban design and street connectivity.

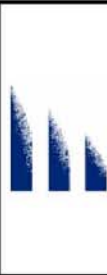
The Future Thoroughfare Plan

The proposed *Future Thoroughfare Plan* is the skeletal system that supports the *Future Land Use Plan* (Plate 4-2 in Chapter 4). It is also the first step in the City's regulatory program for right-of-way dedication and acquisition. The proposed *Future Thoroughfare Plan* for Frisco is shown on page 6.12. The Plan generally represents a grid-system with curvilinear segments where natural features, such as creeks and topography, warrant. Although the exact location of roadways cannot be predicted prior to extensive engineering and environmental analyses, the significance of the roadways shown on the *Future Thoroughfare Plan* is the connection they provide. As with the *Future Land Use Plan*, this *Future Thoroughfare Plan* should be used as a guide as development occurs, specifically in how connections should be made and by what type of thoroughfare.

It should be noted that roadways are the primary means of transportation reflected on the *Future Thoroughfare Plan*. Future proposed transit rail stations are also shown, as is the railroad line that is anticipated to be used for the transit system. The City has a separate *Hike & Bike Trail Master Plan* that currently represents the adopted policy on where hike and bike trails should be integrated; this plan is discussed within this chapter starting on page 6.34, and the map related to that plan is shown in *Figure 6-23* (page 6.35). Hike and bike trails are recognized by the City as extremely important alternative modes of transportation via pedestrian and bicycle connections.







City of Frisco, Texas

Future Thoroughfare Plan

- Highway / Tolway
- Major Thoroughfare
- Minor Thoroughfare
- Minor Collector Street
- Major Collector Street
- Future Regional Rail Line
- Regional Rail Stations
- Grade Separated Interchange
- Grade Separated Railroad Crossing
- City Limits



Plate 6-1

Dunkin Seiko & Associates, Inc.
Urban Planning Consultants

Townscape, Inc.

Kimley-Horn and Associates, Inc.

Frisco GIS
Department of Information Technology



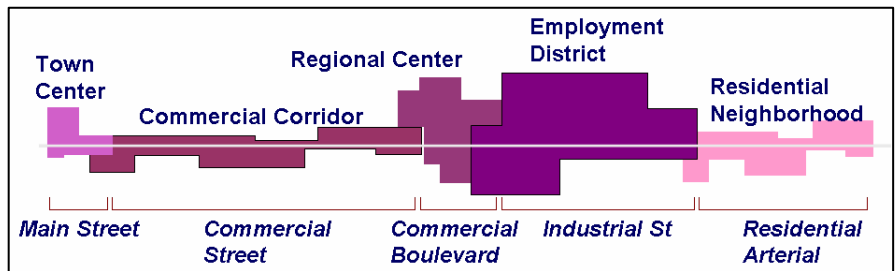


Urban Design

Creating a connection between the street and the adjacent land uses is often an element of street design that is overlooked. Neighborhood Workshops conducted during the Visioning phase of this comprehensive planning process (see Chapter 2) demonstrated that the look and feel of streets is a major priority for the citizens of Frisco. The look and feel of streets is one of the most effective ways to reinforce the desired image of the City, and in turn attract new residents, businesses, and investment.

Frisco is doing an excellent job of streetscaping. However, a number of enhancements, or urban design elements, used in an area often depends on the types of adjacent land uses. *Figure 6-11* illustrates the concept of the changing thoroughfare as it passes through different land use types. The concept is that the elements of the street must complement the adjacent development. For instance, the same roadway may need to be designed as a commercial boulevard as it traverses a regional center, but may need to be altered to a residential arterial configuration as it passes through a residential neighborhood.

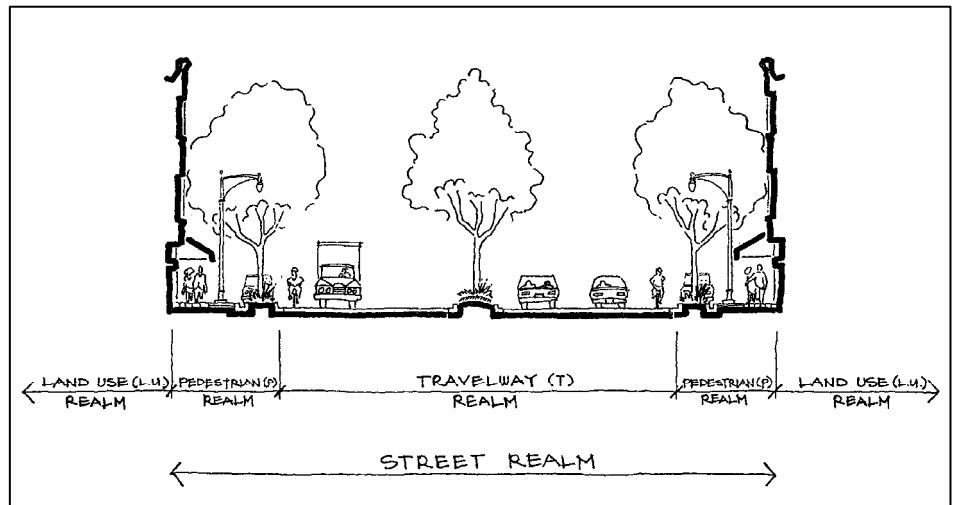
Figure 6-11
CONCEPT THAT A THOROUGHFARE SHOULD CHANGE AS THE ADJACENT LAND USES CHANGE



It is critical to understand how the elements of a street can work together to meet all the transportation goals of accommodating the various needs of automobiles, pedestrians, and land uses. The anatomy of streets can be divided into four major realms (see *Figure 6-12*):

- ❖ Travelway Realm,
- ❖ Pedestrian Realm,
- ❖ Land Use Realm, and,
- ❖ Intersection Realm.

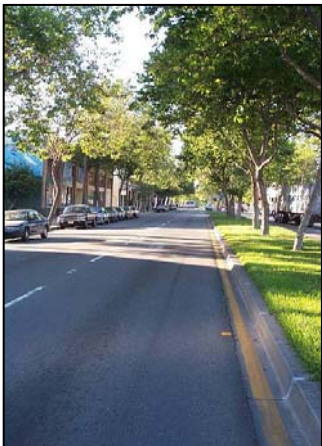
Figure 6-12
COMPONENTS OF THE ANATOMY OF STREETS



While the intersection realm is not illustrated in *Figure 6-12* (page 6.13), it is an area of the street that deserves special attention as it is often the gateway to a community and has the greatest amount of pedestrian activity.

TRAVELWAY REALM

This area is defined by the travel lanes between the curb lines. The dimensions within the *Travelway Realm* are clearly defined within the City’s “*Thoroughfare and Circulation Design Requirements*.” However, additional mixed use roadways are presented in this section under *Functional Classification*. There should be a relationship between the street edge and the adjacent land use. For instance, in mixed use areas that are located adjacent to collector streets or minor thoroughfares, on-street parking, or alternative travel lane widths may be appropriate.



The Travelway Realm

PEDESTRIAN REALM

The *Pedestrian Realm* is defined by the area between the curb line and the right-of-way line. Most of the time, this area provides the best opportunity to incorporate urban design elements. These elements should vary by the adjacent land use. For instance, the pedestrian realm for mixed use, transit, or single-use areas should be different.

In mixed use or transit areas (image at the right) a number of amenities may be provided to draw people out and encourage strolling and relaxing. The amenities include, but are not limited to the following:

- ❖ Wider sidewalks,
- ❖ Tree wells,
- ❖ Street furnishings such as benches,
- ❖ Lamp posts,
- ❖ Bollards,
- ❖ Drinking fountains
- ❖ Trash containers,
- ❖ Flower and shrub planters,
- ❖ Trees,
- ❖ Mounted maps,
- ❖ Informational kiosks, and,
- ❖ Directional signs.



The Pedestrian Realm in a Mixed Use or Transit-Oriented Area



The Pedestrian Realm



Benches or planters are especially beneficial to senior citizens and the disabled, who can use them for frequent stops to rest. These and other amenities reward other pedestrians by increasing the attractiveness and comfort of the environment, making walking a natural and pleasurable part of the day. They give residents a reason to come out of their homes and cars and get to know their community and neighbors, which is the essence of a “home town” ambience.

In single-use areas (retail, commercial, or residential), the *Pedestrian Realm* should be configured differently. The *Pedestrian Realm* should provide shaded pedestrian and paved areas to create a comfortable walking environment and to reduce surface and ambient temperature. This could include a combination of trees and other shading devices such as utilizing building shadows, canopies and awnings. Retail areas should include a sidewalk out to the curb, with trees in wells. This would accommodate parking or drop-off areas where allowed.

Low density residential and office uses should have a different *Pedestrian Realm*. In these areas, a landscape buffer can be integrated between the sidewalk and the curb. Major thoroughfare streets, where no on-street parking or drop-off is allowed, should have a distinct landscape buffer with trees between the sidewalk and curb to provide pedestrians with a feeling of safety. To ensure that the *Pedestrian Realm* is established appropriately with adjacent development, adequate sidewalk widths and pedestrian amenities need to be considered as roadways are initially planned, designed and constructed.

LAND USE REALM

The final realm to be discussed is the *Land Use Realm*. This is the area adjacent to the roadway and is entirely within private property. It is important to discuss because it defines the “look and feel” of the area. This *Realm* contains significant differences as people cross through different land use areas. Almost entirely dictated by zoning, this realm can differ radically between rural, residential, retail and mixed use areas. The *Land Use Realm* seeks to describe the character and activities associated with the adjacent land uses and the configuration of the roadway and its parkway. A key concept is the compatibility between the thoroughfare and its context, both physically and operationally. The *Land Use Realm* acknowledges the contexts of community, environment and transportation needs, and knits them together to improve mobility and livability.

Just like in the *Pedestrian Realm*, the characteristics of future land use development—whether mixed use, transit-oriented, or single-use (retail, commercial, or residential)—should be reflected in the context areas. For example, the elements in a mixed use area along a non-thoroughfare roadway should include build-to lines, with well defined pedestrian signage, buildings with transparent windows, parking behind the buildings (or on the street), and a pedestrian-friendly environment. Conversely, in areas that



The Land Use Realm in a Mixed Use or Transit-Oriented Area



are conventionally developed with single-uses (such as commercial, retail or residential development along a thoroughfare roadway) build to lines that place the buildings away from the street will characterize the *Land Use Realm*.

INTERSECTION REALM

This area is within the public right-of-way and involves abutting private property. It creates a frame for the roadway with the intersection at its center. The *Intersection Realm* is characterized by a high level of activity and shared use, multi-modal conflicts (mainly bicycle- and pedestrian-to-vehicle), complex movements, and special design treatments. These areas often serve as entrances into a special district or development and, as such, deserve special urban design treatment to create a landmark or memorable “node.” (See *Chapter 4, Livability – Accepted Principles for Good Community Design.*) Within Frisco, there are tremendous opportunities to incorporate specific amenities to create a sense of “identity.”



The Intersection Realm



A Roundabout Creates a Special Element within the Intersection Realm

Intersection areas should include clearly marked pedestrian cross walks at signalized intersections and curb ramps, decorative lighting, landscaping, and even special art or monuments. Other intersection treatments may also be appropriate, such as the use of modern roundabouts. These may be used in special cases, such as along local or collector streets, with approval from the City’s Engineering Services Department.

Mixed Use & Multi-Modal Streets

With more of an emphasis on a multi-modal system, it is important to provide a roadway environment that will accommodate the necessary features of mixed-use and transit-oriented developments. While roadways serving these land uses need to require more “pedestrian-friendly” elements and on-street parking, it is still important to provide efficient automobile movement through these areas and provide adequate emergency access.



SIDEWALKS

The sidewalk along a mixed-use street is the primary physical environment of the *Pedestrian Realm*. Often, sidewalks in mixed use areas are wider than the travel lanes—an example of this can be found in the West End of Dallas. The sidewalk is where most of the activity occurs. For mixed use streets to be successful, the design of facades and ground floors of buildings and their relationship to the street must focus the attention toward the street. Transit amenities, when located on sidewalks, are part of a range of "street furniture" that is essential to designing a successful "transit street." Street trees, wide sidewalks, benches and other amenities make streets more comfortable and active.

ON-STREET PARKING

Beyond urban design features and sidewalks, on-street parking is the most important element in a mixed-use street design. The presence of parked cars reduces travel speeds, separates pedestrians from the vehicles and aids in the vitality of retail establishments. For instance, the adjacent figure uses on street parking as a buffer for pedestrian activity.



On-Street Parking Provides a Buffer in a Mixed Use Area

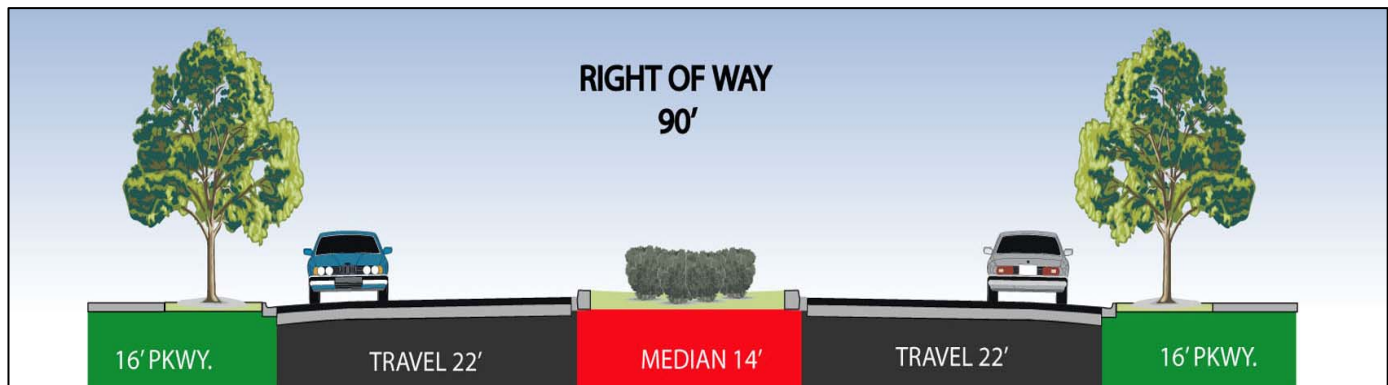
NEW ROADWAY SECTIONS FOR MIXED USE & TRANSIT-ORIENTED DEVELOPMENT

The existing roadway cross sections (outlined in the *Existing Transportation System* section of this chapter) will be carried forward with the addition of three new roadway types that will provide narrower lanes so that more space can be provided for pedestrians and on-street parking. These new roadway types should primarily be used in mixed-use (e.g., town center areas such as Legacy Town Center, and urban village environments) and transit-oriented areas to blend with the adjacent development. The exact dimensions and geometrics will be resolved by the City's Engineering Services Department.

Figure 6-13 (page 6.18), Figure 6-14 (page 6.18), and 6-15 (page 6.19) are cross-sections of the recommended roadway types. The new roadway cross-sections incorporate narrower lane widths, which encourages slower vehicle speeds, and wider pedestrian facilities. It should be noted that although these roadway sections do not show sidewalks or related widths, all sidewalks in mixed use and TOD areas should generally be 15 feet in width to create a pedestrian environment. Two of the new roadway cross-sections will accommodate on-street parking. Also, two of the roadway types will become additional minor thoroughfare streets, while the third will be a collector street.

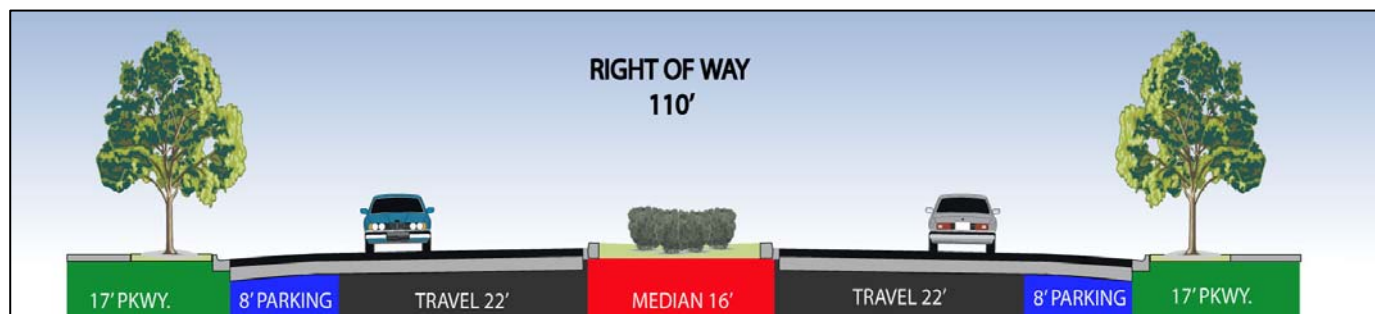


Figure 6-13
MINOR THOROUGHFARE 2 (MIXED USE OR TRANSIT-ORIENTED DEVELOPMENT)



The *Minor Thoroughfare 2* (Figure 6-13 above) shows a section with a reduced median width and travel way and an increased parkway width for pedestrians. No on-street parking should be permitted on this type of thoroughfare. Angled parking should be considered, but would require additional right-of-way. Angled parking should not encroach on any required sidewalk. The 90-foot right-of-way foot print for this roadway type will be the same as the existing *Minor Thoroughfare* roadway type (Figure 6-2 on page 6.4).

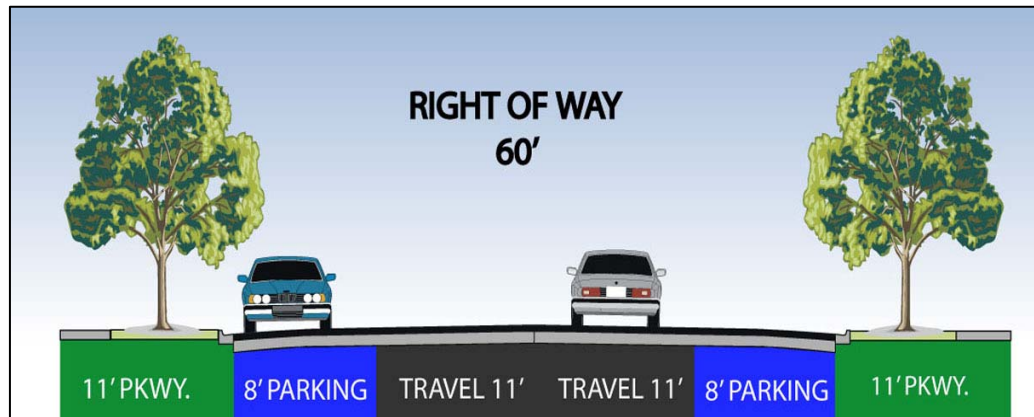
Figure 6-14
MINOR THOROUGHFARE 3 (MIXED USE OR TRANSIT-ORIENTED DEVELOPMENT)



The *Minor Thoroughfare 3* cross-section shown in Figure 6-14 proposes an increased right-of-way footprint of 110 feet (compared to the *Minor Thoroughfare 2*). This roadway type provides on-street parking with the same travel way and median widths. Coleman Boulevard within Frisco Square is an example of this type of roadway. The parkway area is increased slightly for *Minor Thoroughfare 3*.



Figure 6-15
COLLECTOR 2 (MIXED USE OR TRANSIT-ORIENTED DEVELOPMENT)



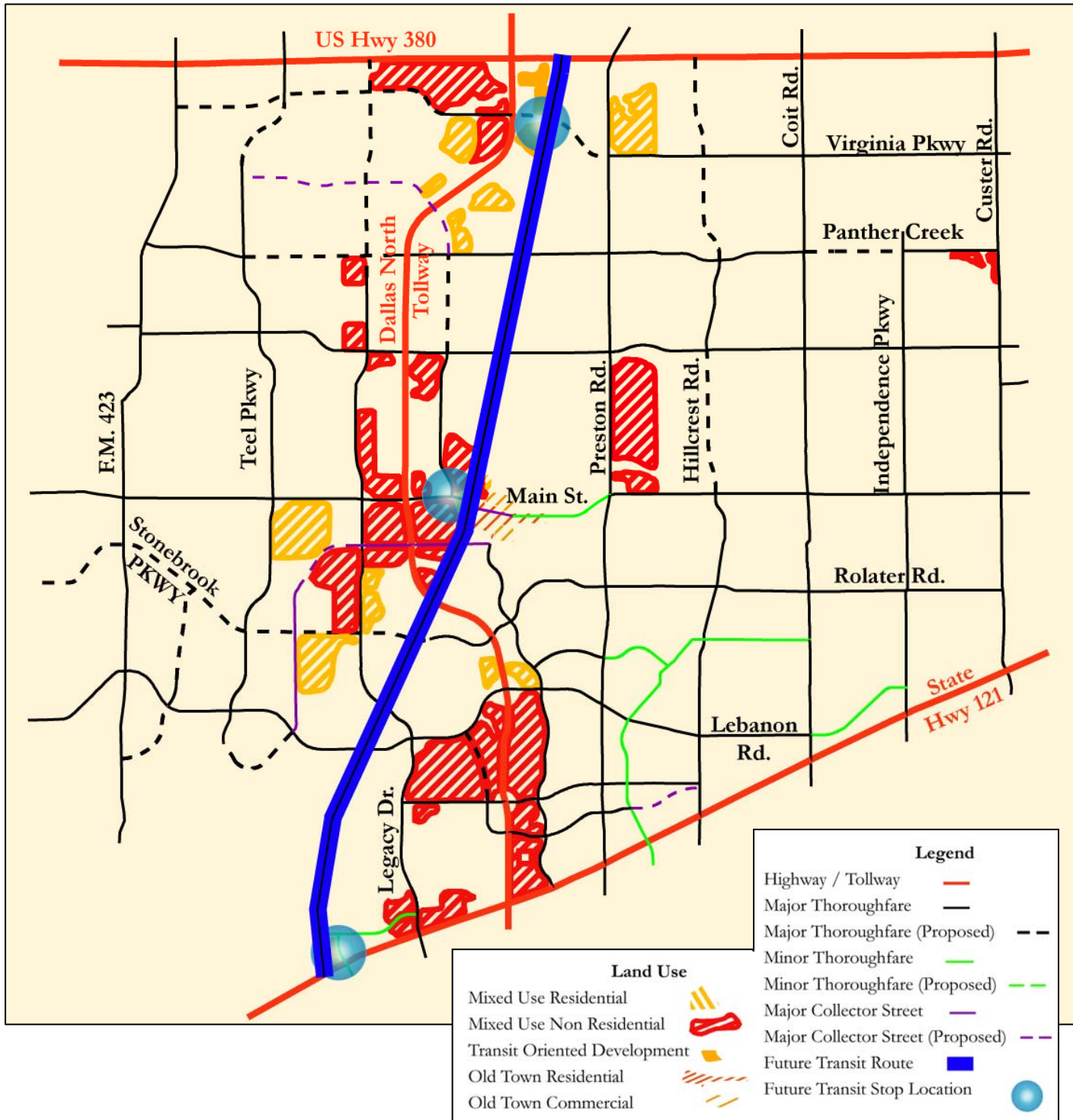
The third roadway type recommended is a *Collector 2* (Figure 6-15). This typical section maintains the same 60-foot right-of-way footprint, and adds eight feet of on-street parking to both sides of the street.

Applying these new standards to roads located within land use areas designated on the *Future Land Use Plan* (Plate 4-2, page 4.10) as *Mixed Use* or *Transit-Oriented Development* will be left to the discretion of the City. These standards apply only to new roads in newly developed areas (i.e., not in areas that are currently developed). These new streets were developed as a way to integrate streets with adjacent mixed use character. The map, Figure 6-16, on page 6.20 represents the *Mixed Use* and *Transit-Oriented Development* areas where these street types might apply.





Figure 6-16
POSSIBLE LOCATIONS FOR NEW MIXED-USE ROADWAY CROSS SECTIONS





STREET SYSTEM CONTINUITY

The location of median openings must comply with the City's Access Management standard outlined within the City's Thoroughfare and Circulation Design Ordinance. The following sub-sections outlines ways in which streets throughout Frisco can be better connected to each other as development occurs. As the various discussions below explain, increased connectivity will help to improve both mobility and access.

INTERCONNECTED STREET SYSTEM

A city's roadway system design should provide improved connection between residences and other land uses and should complement goals in the areas of urban design, livability and sustainability. In order to improve livability in residential areas, it is important to enhance the flexibility of routes and modes of transportation. An interconnected street pattern that provides flexibility of routes and increased number of access points for private and emergency vehicles lessens automobile congestion and reduces dependence on a few major thoroughfares.

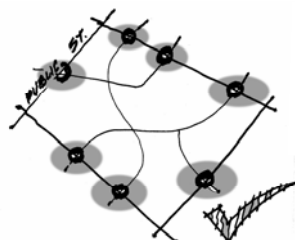


Where residential streets are long and have limited access to adjacent developments, every trip is a long one, especially to simple services.

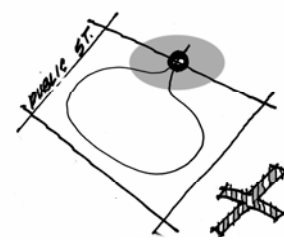
The result of an interconnected system is generally a grid pattern which can be modified to provide interest and accommodate natural features. Additionally, this type of system accommodates continuous sidewalks, short blocks and safe pedestrian crossings which slow traffic to the desired speed, facilitates local circulation, shortens walking distances and provides a reasonable structure to the community. Shorter blocks that encourage lower vehicle speeds are especially appropriate to facilitate circulation in high density and mixed use development. Additionally, for trails running along creeks, it is important to provide grade-separated pedestrian and bike trails as part of bridge structures that cross creeks or flood plains.

Figure 6-17 shows multiple access points between developments. This can provide a great deal of relief on the major thoroughfare intersections throughout the city. Essentially, this concept spreads the traffic out and allows greater flexibility of trip path and ultimately reduces "miles traveled" and lessens the burden on the intersections.

Figure 6-17
MULTIPLE VERSUS SINGLE ACCESS POINTS



MULTIPLE ACCESS POINTS



ONE ACCESS POINT

Multiple access points are particularly important for mixed use developments and residential areas with more than 2 units per acre.



Frisco’s previous thoroughfare planning efforts have resulted in a robust series of thoroughfare streets—essentially major thoroughfares on a one mile grid system. While this does provide an efficient way to handle large volumes of traffic, it has limited collector streets. The interconnected streets concepts illustrated above encourage the use of collector streets to provide spacing of a half-mile or less spacing for collector streets. This concept also discourages use of cul-de-sacs (without an interconnected street system) which often can result in longer trip lengths and less points of access for emergency vehicles. Other advantages of having an interconnected street system include:

- ❖ Distributes trips more efficiently;
- ❖ Helps manage traffic speed due to proper intersection spacing; and
- ❖ Provides multiple points of ingress and egress for emergency vehicles.

STREET INTERSECTIONS

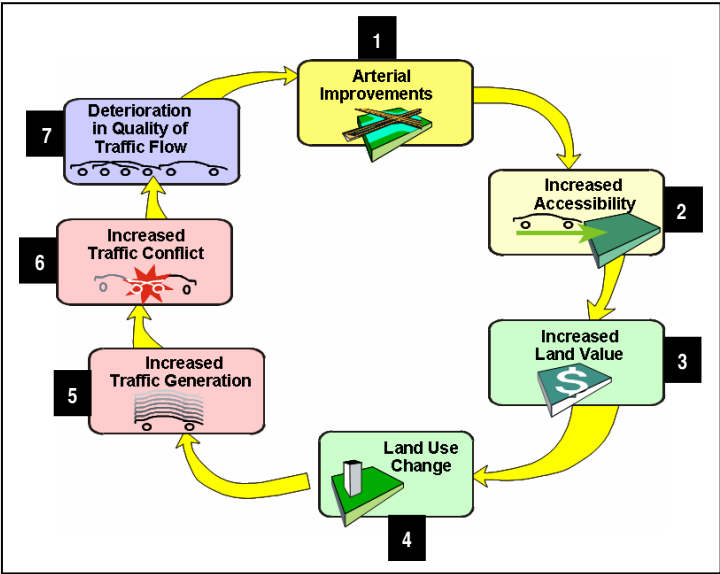
The City should continue its practice of assuring that street intersections are properly aligned; this will further ensure street continuity. When collector streets are planned to connect to major thoroughfares, careful thought needs to be given to the location of the connection. In some cases, median openings are needed to allow for left-turn in-and-out access. At such locations, the median openings need to comply with the City’s *Access Management Policy* on median opening spacing. Enough space between median openings needs to be provided to allow for proper deceleration and storage (for vehicles to stack up behind one another). Also, along divided thoroughfares roadways, median openings should be aligned with one another to minimize the number of openings needed for access, and to further the coordination of installing traffic signals (if signals become necessary at that location).

ACCESS MANAGEMENT

Access management is another important aspect to street continuity. Access management seeks to improve safety, reduce congestion, and to protect the City’s transportation investment. Many of the concerns related to access management are the same as those discussed in relation to street intersections above—median openings, access, deceleration and storage of vehicles.

Figure 6-18 depicts the typical life-cycle of a roadway without access management. As

Figure 6-18
TYPICAL LIFE-CYCLE OF A ROADWAY WITH NO ACCESS MANAGEMENT





investment is made to improve a thoroughfare, the access to development is increased, land uses change, traffic increases, and thus conflicts for crashes increase and eventually the road ceases to operate effectively. Access management attempts to break this cycle. This *Transportation Strategy* therefore endorses the City's *Access Management* standards. The proposed policies on access management in relation to specific roadways is developed in greater detail in the *Transportation Policies* section that begins on page 6.37.

Traffic Systems Management

Efficient operation of the roadway network is of the utmost importance to the traveling public. The City should continue to explore and use up-to-date techniques and technologies to help maintain an acceptable level of service on roadways. Coordinated signal timing plans, and a program to update coordinated signal timing with changes in traffic volumes and traffic patterns are vitally important to the everyday operation of the City's roadway network. Also, the City should use the latest state-of-the-practice and state-of-the-art equipment to maintain and improve safety on local roadways.

Updated and reliable traffic signal control equipment is extremely important to overall mobility in Frisco and the ability to operate coordinated signal timing plans. This not only includes the hardware and signal controller in the cabinet to efficiently control the overall system, but also the following components:

- ❖ Reliable vehicle detection on the street (inductive loops or video);
- ❖ Communications equipment that provides a link to equipment in the field; and
- ❖ Central control equipment (computers, radios, video monitors, software).

Having a reliable means of communicating with field devices from a centralized location is an extremely important aspect of maintaining efficient roadway operations, especially on a network the size of Frisco's. It is much more economical to manage field equipment from one location than to visit each intersection individually. Even if an incident does require someone in the field, a reliable system often makes it possible to know beforehand exactly what the situation entails, who needs to respond, and what equipment they will need to have with them when they get to the incident location. Some of the devices that are commonly used to improve and maintain efficient operations on the roadways from a centralized location include, but are not limited to, variable message signs, dynamic lane signing, and video monitoring cameras placed at strategic locations along thoroughfares.

Incident and special event management plans can be prepared in anticipation of numerous types of incidents, special events, or regularly occurring events such as soccer matches and concerts at Pizza Hut Park. Management of such events could include the use of video monitoring cameras to verify an incident or event, variable message signs to help divert traffic, modified coordinated signal timing plans to better handle the diverted traffic, and even dynamic lane assignment signs to more efficiently manage available lanes. Just a few occasions when such plans would be put into effect include:



- ❖ Incidents blocking lanes on certain stretches of major roadways;
- ❖ Planned roadway construction;
- ❖ Pre-game traffic heading to a ballpark, arena or stadium;
- ❖ Post-game traffic leaving the venue; and,
- ❖ Increased traffic volumes associated with tax-free shopping days or the day after Thanksgiving.

Traffic systems management is a means of addressing these impacts and improving livability in neighborhoods. The modeling information presented in the *Existing Transportation System* section demonstrates that congestion will increase on the thoroughfare street system. This will likely impact the neighborhood collector and local street system by resulting in speeding and cut-through traffic attempting to avoid delays on the major streets. Traffic systems management is a City-wide issue. Treating every issue as though it were unique and unusual is ineffective and inefficient. In addition, many problems and solutions need to be looked at from a broad perspective to ensure that one neighborhood's solution does not become another neighborhood's problem, and from a slightly narrower perspective that one street's solution does not become another street's problem. A traffic systems management program is an effective, systematic, and fair approach to addressing the need to ensure an acceptable level of service as Frisco's population and traffic volumes continue to increase.

Traffic Calming

Frisco's *Traffic Calming Guidelines* are intended to provide a consistent, City-wide approach to addressing neighborhood traffic and transportation issues related to safety, traffic speed, and traffic volume on streets. The methods, devices and purposes of traffic calming are not new to Frisco. Traffic calming efforts are intended to help drivers avoid speeding and to reduce cut-through traffic.

The City's approach to traffic calming recognizes that a street is a highly complex environment with multiple competing interests. These interests include land access and livability verses mobility, vehicular accommodations verses multimodal balance, and consistency of function verses flexibility of form. The following descriptions of potential traffic calming devices are directly linked to the City-wide street designations and are intended to enhance both the form and function of current and planned City streets.



TRAFFIC CALMING DEVICES

CURB RETURN RADII

Curb return radii are the curved connection of curbs at the intersection of two streets. Their purpose is to guide vehicles in turning corners and to separate vehicular traffic from pedestrian areas at intersection corners. The current City of Frisco *Thoroughfare and Circulation Design Requirements* document defines standard intersection layouts, which includes specific curb radii.

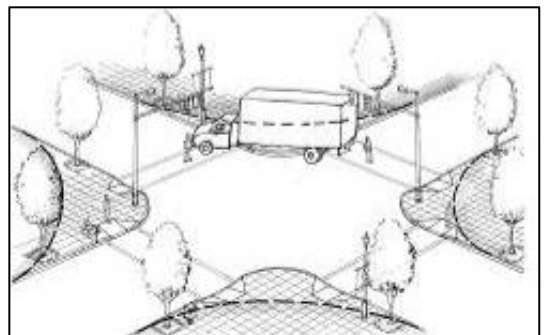
This sub-section seeks to define a general strategy for selecting the curb return radii design criteria and discusses situations requiring larger radii. In conventional street design practice, the largest vehicle that might use the facility is selected as the “design vehicle” which will result in an increase in pedestrian-crossing distance due to the larger radii. Instead of this conventional practice, the smallest curb radius should be selected that will accommodate the necessary right-turn movements of the design vehicle (including emergency response vehicles) and facilitate pedestrian crossings of intersections in a safe and comfortable manner. Factors that should determine curb return radii include:

- ❖ Width of the receiving lane;
- ❖ Tolerance of encroaching into opposing lanes;
- ❖ Number and frequency of large vehicles;
- ❖ Angle of the turn;
- ❖ Vehicle and pedestrian volumes; and
- ❖ Existence of bike and/or parking lanes.

CURB RETURN RADII STRATEGY

Curb return radii should be designed to accommodate the largest vehicle (especially emergency response vehicles) that will regularly and frequently turn the corner (sometimes referred to as the control or design vehicle). This principle assumes that the occasional large vehicle can encroach into the opposing travel lane. If encroachment is not acceptable, then a larger design vehicle should be used.

- ❖ In urban centers, transit-oriented developments, and mixed-use areas where pedestrian activity is intensive, curb return radii should be as small as possible.
- ❖ A design vehicle should be selected by determining the frequency of large truck and bus turns at the intersection. Bus routes should be identified to determine whether buses are required turn at the intersection. Existing and potential future land uses along both streets should be reviewed to evaluate potential truck trips turning at the intersection.



Smaller curb return radii shorten the distance that pedestrians must cross at intersections. The occasional turn made by large trucks can be accommodated with slower speeds and some encroachment into the opposing traffic lanes.

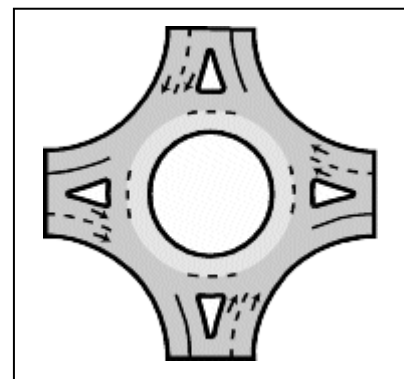


- ❖ Curb return radii of different lengths can be used on different corners of the same intersection to match the design vehicle turning at that corner. Variable curves can be used to better match the wheel-tracking of the design vehicle.

If encroachment into oncoming lanes and/or the roadside is unacceptable, pavers, colored stamped concrete, stone, or other contrasting material on the street should be considered. This would provide the visual appearance of a narrower street, but one that can be traversed by all vehicles.

MODERN ROUNDABOUTS

Modern roundabouts are an alternative form of intersection control that is becoming increasingly more common in the United States. In the appropriate circumstances, significant benefits may be realized by converting four-way stop-controlled and signalized intersections into modern roundabouts. It should be noted, however, that additional right-of-way may be needed for converting intersections to roundabouts, and any such conversion would be subject to the approval of the City's Engineering Services Department. These benefits include improved safety, speed reduction, aesthetics, or operational functionality. With the creation of Federal Highway Administration's guidebook entitled *Roundabouts: An Informational Guide*, States and local agencies interested in roundabouts now have a firm set of design guidelines. Roundabouts require strict conformance to standard practice to ensure safe optimal operation.

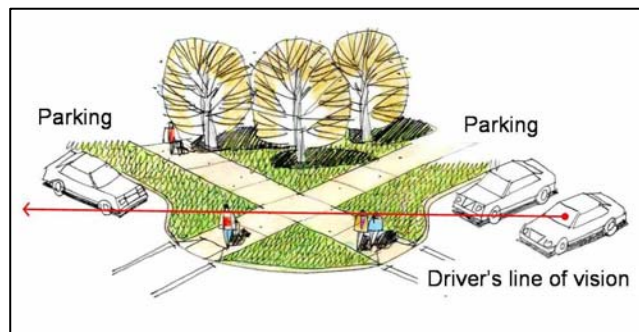


General Roundabout Diagram

CURB EXTENSIONS

Curb extensions (also called bulb-outs or neck-downs) extend the line of the curb into the traveled roadway, thereby reducing the width of the street. Curb extensions typically occur at intersections. Curb extensions provide several benefits:

- ❖ Reduce pedestrian crossing distance and exposure to traffic;
- ❖ Improve driver and pedestrian sight distance and visibility;
- ❖ Narrow the traveled way both visually, and physically, resulting in a calming effect;
- ❖ Encourage pedestrian crossing at preferred locations;
- ❖ Keep vehicles from parking too close to corners and blocking crosswalks;
- ❖ Provide wider waiting areas at crosswalks and intersection bus stops;



Curb extensions can shorten the distance a pedestrian needs to travel across an intersection.



- ❖ Reduce the curb return radius to effectively slow turning traffic; and,
- ❖ Enhance Americans-With-Disabilities Act (ADA) requirements by providing space for level landings.

Curb extensions serve to better define and delineate the travelway as being separate from the parking lane and roadside. They are used where on-street parking would typically be delineated only by pavement markings and where the distance between curbs is greater than what is needed for the vehicular traveled way.

Mobility of the New Transportation Strategy

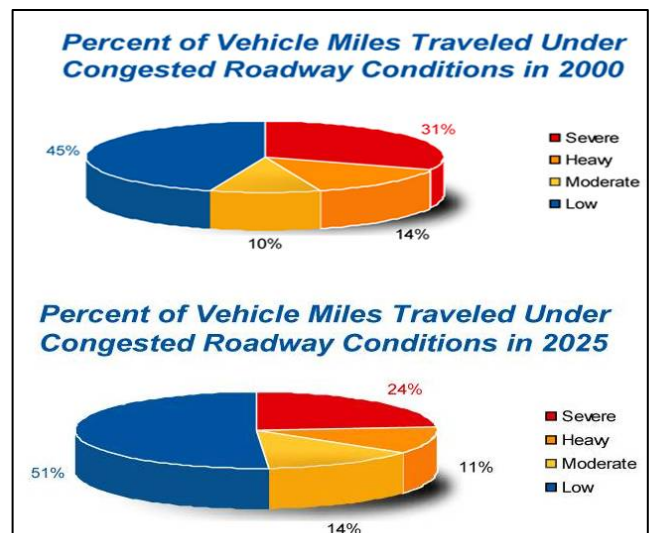
This sub-section provides an overview of Frisco mobility based on the proposed *Future Land Use Plan* within the *Land Use Strategy* (Chapter 4). The City is fortunate to have a state-of-the-art tool for transportation planning. This tool is a regional modeling application called TransCAD, which enables Frisco to estimate traffic trips throughout the City and beyond. In the simplest terms, the tool (or model) turns people and employees into trips, finds their origin and destination, and assigns them a path to complete their trip. The trips are daily, so it accounts for home-to-work, home-to-shop, and back-to-home trips.

With the use of this tool planners and engineers are able to estimate current and future traffic demands. The *Land Use Strategy* (Chapter 4) and related *Future Land Use Plan* (Plate 4-2, page 4.10) plan for the ultimate build-out of the City. The proposed build-out has been incorporated into the model to estimate the traffic demands. As a benchmark, the 2000 Comprehensive Plan (or old land use plan), was also tested in the model (the results of which were described previously within this chapter). The following sections compare the 2000 Land Use Plan with the new 2006 *Future Land Use Plan* (Plate 4-2, page 4.10).

MODELING THE 2000 COMPREHENSIVE PLAN

When the 2000 Comprehensive Plan was developed and adopted, the City did not have its transportation planning model. Therefore, there was no way to look at the traffic impacts associated with that plan (from a technical, quantitative standpoint). The question has always been, “*Will the transportation system handle all the development planned in the 2000 Plan?*” We now know that congestion levels improve slightly between years 2000 and 2025 for what is

Figure 6-19
COMPARISON OF VEHICLE MILES TRAVELED – 2000 AND 2025



termed “severe congestion.”

This *2006 Comprehensive Plan* updates the 2000 Plan. In the 2006 *Land Use Strategy* (Chapter 4), and specifically on the *Future Land Use Plan* (Plate 4-2, page 4.10), many strides were taken to improve the balance between land uses and roadways. Examples of such strides include mixing uses to shorten trip lengths, clustering residential developments, and incorporating alternatives modes of transportation. The comparison of these two plans is discussed below.

THE TRAVEL DEMAND MODEL – ANALYSIS OF THE 2000 COMPREHENSIVE PLAN VS. THE NEW 2006 COMPREHENSIVE PLAN USING BUILT-OUT CONFIGURATIONS

As previously explained within this chapter, the travel demand (or TransCAD) model facilitates the ability to compare how changes to land use and demographics will impact the transportation network. *Table 6-1* compares the demand on the transportation network found from modeling the 2000 Comprehensive Plan and the demand found by modeling the new 2006 *Future Land Use Plan* (Plate 4-2, page 4.10). Both of these modeling efforts were based on build-out configurations of these respective land use plans, using the land uses exactly as proposed. Across the board, the new *Future Land Use Plan* performs much better than the 2000 Plan, with improvements to *Vehicle Miles Traveled*, *Vehicle Hours Traveled* and *Hours of Delay* ranging from 12 percent to 15 percent improvement in congestion levels. These improvements mean that the new *Land Use Strategy* (Chapter 4) and this *Transportation Strategy* are better integrated in terms of land use and mobility needs.

| <div>Table 6-1</div> <div>COMPARISON BETWEEN THE 2000 LAND USE PLAN & THE 2006 FUTURE LAND USE PLAN (PLATE 4-2)</div> | | | |
|---|-----------|--------------------------------|------------------|
| Mobility Factors | 2000 Plan | 2006 Land Use Plan (Plate 4-2) | Percent Change |
| Vehicle Miles Traveled | 6,519,600 | 5,580,000 | 14 % Improvement |
| Vehicle Hours Traveled | 173,200 | 152,000 | 12 % Improvement |
| Vehicle Hours of Delay | 29,900 | 25,500 | 15 % Improvement |

Over the next 30 years, the North Central Texas Region will more than double in population. As discussed in the *Land Use Strategy*, Chapter 4, Frisco’s population will more than triple. This population increase will drastically affect vehicular travel. The travel demand modeling performed in this strategy indicates that the planned roadway and highway improvements alone will not alleviate traffic congestion during peak periods. Alternative travel modes must be explored if Frisco is going to sustain itself in the future as a regional origination and destination point.



Transit and Hike & Bike Trail Integration

Transit Integration

NCTCOG REGIONAL RAIL CORRIDOR STUDY

The proposed Regional Rail System (see *Figure 6-20* on page 6.30) has the ability to relieve congestion for commuters in peak periods. The NCTCOG's Regional Rail Corridor Study revealed that with the amount of ridership expected, a connected regional rail system could have the effect of adding on additional freeway lane in each direction to some of the most congested highways and tollways in North Central Texas. This sub-section of *Transportation Strategy* explores how Frisco can integrate transit into a palette of transportation options that are aimed at reducing the dependence on single-occupant vehicles for commuting and basic services.

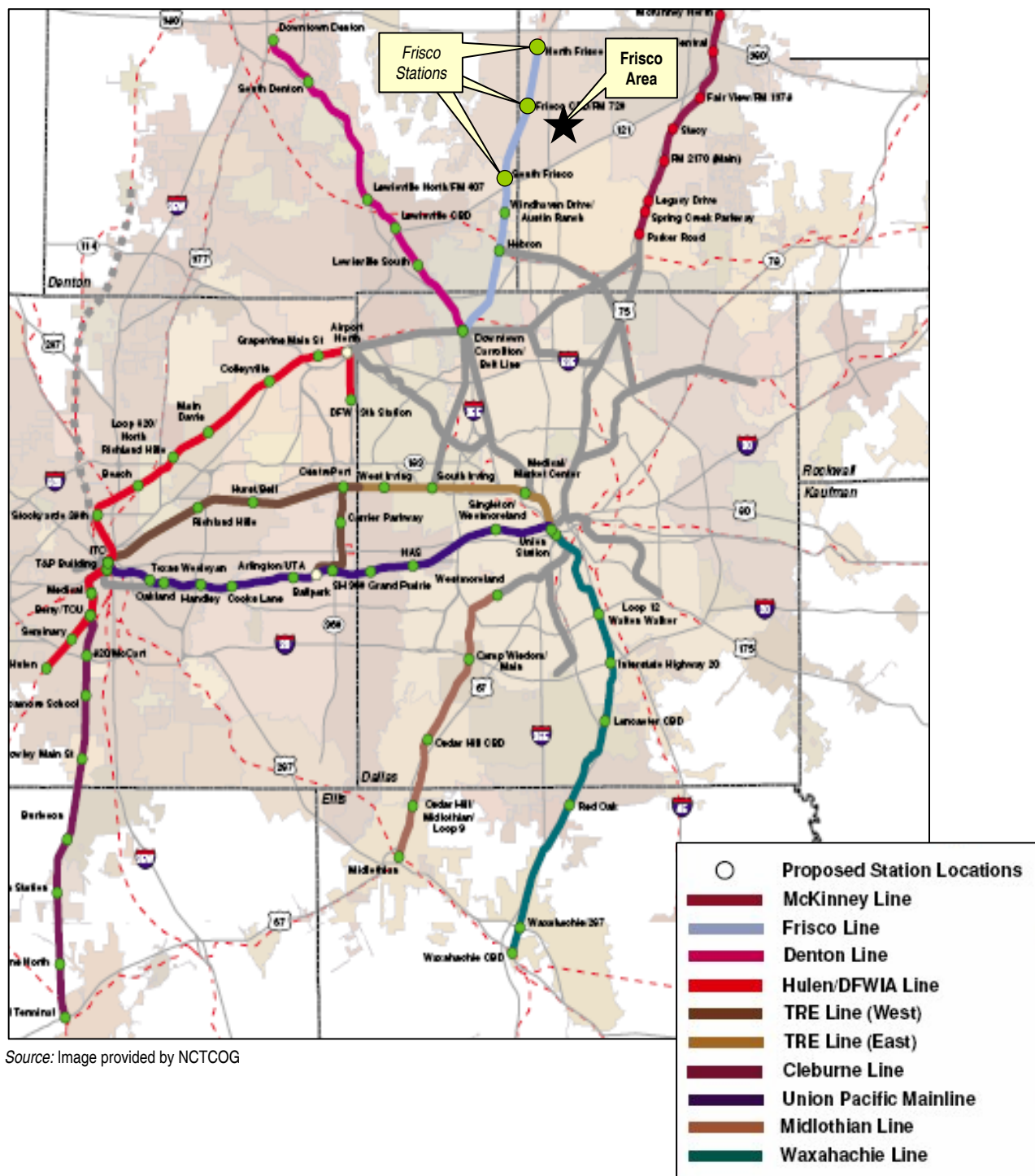
PLANNING FOR TRANSIT

NCTCOG's Regional Rail Corridor Study indicates that the City could obtain up to three commuter rail stations in the future. As displayed in *Figure 6-21* (page 6.31), these potential rail stations would be located along the Burlington Northern (BNSF) line at SH 121, at Main Street (in Downtown Frisco) and near Virginia Parkway in northern Frisco. Rail stations are typically spaced at between three and five miles apart; based on a three-mile spacing, Frisco could obtain more than the three stations that are currently planned. Having additional rail stations (in addition to the proposed three) in Frisco would only serve to further establish the City as a regional destination, and therefore the locating of more stations in the City should be encouraged. The "Frisco Line" (indicated in blue on the next page) is estimated to carry 6,500 daily riders that would otherwise be using the roadway system. This estimate, paired with the current and forecasted severity of traffic congestion, indicates a high level of demand for rail service in the short- and long-term in Frisco. Not only is the estimate for local daily ridership high, which is a benefit for the community, but there are benefits for visitors as well.

The station in the Original Town (Downtown Frisco) area would provide a central transit location that could serve residents and visitors throughout the City. This station could also increase the vitality of Downtown Frisco. Currently and with the new development that is anticipated in the future, this area has much to offer for citizens and visitors alike. Current offerings include shops, sports venues, restaurants, public uses, residential uses, and Frisco Square. There are also future development opportunities for a more dense mixture of non-residential and residential uses.



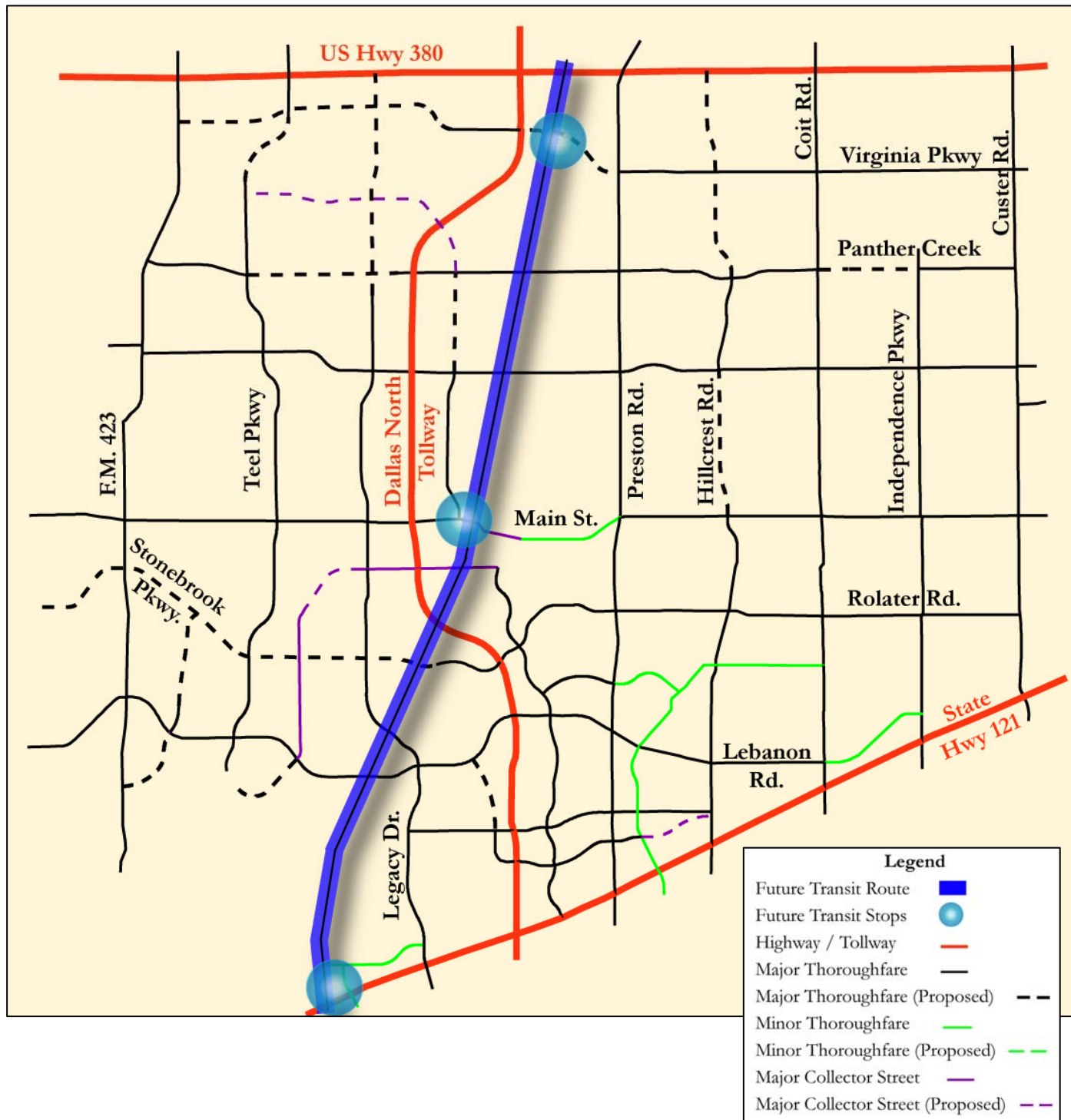
Figure 6-20
PROPOSED REGIONAL RAIL SYSTEM



Source: Image provided by NCTCOG



Figure 6-21
THE FRISCO LINE BASED ON THE REGIONAL RAIL CORRIDOR STUDY



The area north of Main Street along the DNT accommodates office, retail and residential areas. The northern rail transit station would be located near Virginia Parkway and the BNSF line. This rail transit station would serve the residents on the north side of Frisco that would like to go to Downtown Frisco or travel further south. This station would also provide an opportunity for the extension of transit service to the north (into Prosper). A station near SH 121 and the BNSF line will be the City’s southernmost transit opportunity. This station would be located just north of SH 121 with efficient access to and from high speed freeways.

SUPPORTING TRANSIT THROUGH DEVELOPMENT

The *Future Land Use Plan* (Plate 4-2, page 4.10) in the *Land Use Strategy* (Chapter 4) designated areas immediately surrounding the regional rail stations as *Transit-Oriented Land Uses*. *Transit-Oriented Development* consist of areas of high density, mixed use districts where people can live, work, shop and play within a short walking distance. It will be important to provide convenient and attractive transit station locations in order to encourage ridership. In some cases, development might be spurred by the transit station; however, it will be important to plan land uses that will encourage ridership for future transit stations. As a result of such development patterns near transit stations, vehicle miles traveled will be reduced, air quality will be improved and congestion will be minimized. Transit-based policies are set forth in the *Transportation Policies* section of this *Transportation Strategy* chapter. These policies outline specific ways in which transit and transit-oriented development can be successful endeavors in Frisco. It should be noted that if more rail stations (than the currently anticipated three stations) are located in Frisco, TOD areas should also be considered in those locations.



SUPPORTING A TRANSIT CIRCULAR SYSTEM

A localized transit system should be considered either immediately prior to, or following, the establishment of regional rail. Recommendations are not being made for the type of technology or look of the transit in this *Transportation Strategy*; however, it should be recognized that any type of transit technology used should strive to be unique so that it attracts businesses and promotes Frisco as a distinctive City in the area. As a result of the planned land uses and the projected regional rail transit, it was determined that two circular routes could be sustained (see *Figure 6-22* on page 6.33). Both routes converge on the Original Town Commercial area located along Main Street and the Dallas North Tollway. It should be noted that these routes represent only the initial transit circular routes that should be established. These are priority routes that would serve anticipated mixed use/higher density areas and as feeder lines to currently proposed rail stations. An expanded system with additional routes, especially east-west routes, should be added as the system is increasingly utilized.



Figure 6-22
POSSIBLE INITIAL TRANSIT CIRCULAR ROUTES WITHIN THE CITY



NORTH TRANSIT CIRCULAR

The northern circular route would serve the area between Main Street and Panther Creek and provide local residents access to the northern central rail station, or to a more southern destination. The proposed western boundary is Legacy Drive while the eastern boundary would be Frisco Street. This circular route would serve a wide variety of land uses as well as provide access to the central rail station.

SOUTH TRANSIT CIRCULAR

The transit route south of Main Street would have a southern boundary of Gaylord Parkway. The north-south streets serving this area would be Legacy Drive, Preston Road, and Parkwood Boulevard. This would serve the large residential area along Stonebrook Parkway, as well as office and retail, such as within Hall Office Park and Frisco Bridges. Also served would be the planned mixed use residential area that is shown on the *Future Land Use Plan* between Stonebrook Parkway and Cotton Gin on the east side of Legacy Drive. Additionally, two major entertainment venues are located near the southern end of this route. The Dr Pepper/Seven Up Ballpark is located on the northeast corner of SH 121 and the DNT. This stadium accommodates over 10,000 people and is home to the Frisco RoughRiders (affiliate of the Texas Rangers). Roughriders games have become a popular event for local residents and visitors to Frisco. Located next to the Dr Pepper/Seven Up Ballpark is the Dr. Pepper Starcenter and the Kurt Thomas Gymnastic Center. The southern circular bus route would also serve the major retail site of Stonebriar Centre.

Hike & Bike Integration

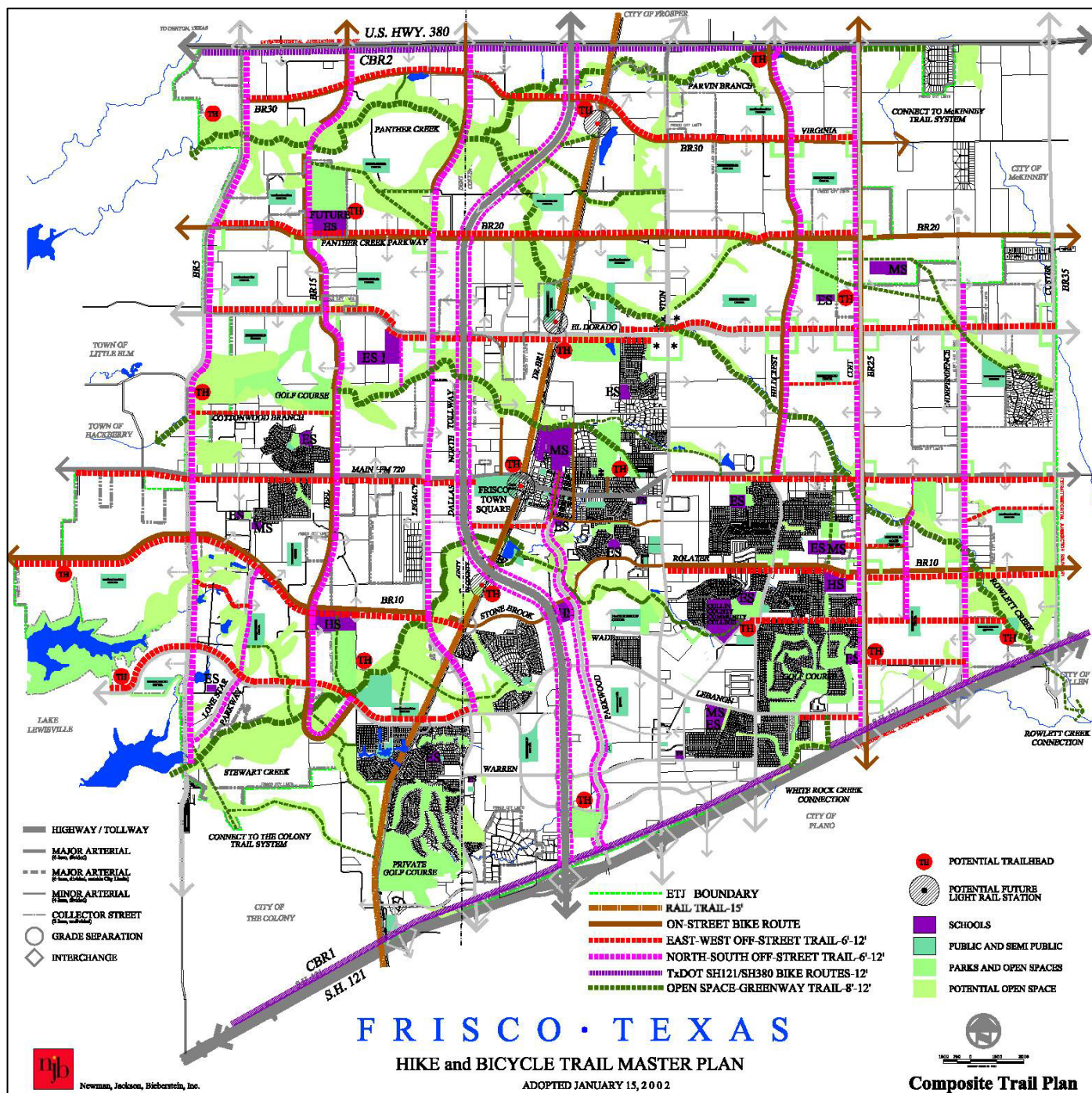
The City of Frisco is planning to update their *Hike & Bike Trails Master Plan* in the near future,. One of the primary issues raised throughout the public process (discussed in Chapter 2) has been the need for more hike and bike trails and better interconnectivity. The need for a trail system has also been discussed within the *Land Use Strategy* and *Livability Strategy* chapters of this Comprehensive Plan. The 2002 *Hike & Bike Trails Master Plan* shows both on-street and off-street trails throughout Frisco. The on-street trails have been designated to occur on most of the major and minor thoroughfares within the City. Therefore, it is important to plan how and where, along the street, the trails will exist. The map on the following page (*Figure 6-23*, page 6.35) shows the current, adopted *Hike & Bike Trails Master Plan*.



Example of a Trail



Figure 6-23
CURRENT (2002) HIKE & BIKE TRAILS MASTER PLAN



The system of trails throughout the City is focused on connecting neighborhoods to schools, major activity centers, parks, and future transit stations for recreation, for the purpose of providing an alternative mode of transportation. These trails can be developed in a way that is both pleasant and practical, either on-street or off. With routes on the major thoroughfares (via six- to 12-foot sidewalks), and even along Texas Department of Transportation (TxDOT) highways, such as State Highway 121 and US Highway 380, these routes can serve as a means of transportation for people traveling to work. Connecting trails to the future transit stations can also be a catalyst to encourage bike trips to final work destinations. When the 2002 *Hike & Bike Trails Master Plan* is updated, it will reflect the correct locations of the three proposed commuter rail stations, as well as additional rail stations if they are deemed feasible at that time.

Chapter 4, the *Land Use Strategy*, and Chapter 5, the *Livability Strategy*, both discuss the importance of the integration of a trail system—these chapters have integrated trail concepts by locating land uses, parks and public uses to maximize the affect of the trails, and the connection between trails and livability is discussed in detail

The question now is—how can these routes be integrated better into the Transportation Strategy? The City’s roadway design standards designate sidewalks along thoroughfares to allow for the trails to be developed and constructed. The design standards indicate a 6-foot sidewalk on major thoroughfares. It may be necessary to have trails wider than six feet, therefore, a cross section demonstrating how a 12-foot, off-street hike and bike trail could be integrated into the roadway should also be included. This *Transportation Strategy* encourages close coordination between Planning & Development Services, Engineering Services, and Parks & Recreation Department to develop roadway cross sections with a wider hike and bike pathway.



Transportation Policies

The design of Frisco's street system should complement the City's goals in the areas of land use and urban design, livability and sustainability. The transportation infrastructure should reinforce the elements that makes the City attractive to its citizens and promotes the inviting characteristics shown to visitors and businesses. Additionally, the roadway system should meet driver expectations based on each functional class (described previously herein). These elements have been discussed throughout this *Transportation Strategy*, and are integrated into these *Transportation Policies*.

Transportation-related issues resulting from previous steps within this planning process also need to be integrated into these policies. These include the findings from the *Snapshot* (Chapter 1), which provide foundational information about the City's transportation system. The *Visioning* process also provides insight from the public and the CPAC as to what issues are at the forefront of Frisco's transportation system from the citizens' perspective; such issues included:

- ❖ There is a need for an alternative to the automobile—especially due to the price of gasoline and the amount of congestion occurring.
- ❖ A commuter rail line should be established as soon as possible. Strategic locations where access should be provided include Dallas, the American Airlines Center and Dallas-Fort Worth Airport;
- ❖ There should be a central rail “spine” with a bus or trolley system providing “spokes” to specific areas.
- ❖ There is concern about the expense of mass transit.
- ❖ Streets should be designed with wider outside lanes to accommodate bicycle traffic.
- ❖ Pedestrian and bicycle facilities should be provided to provide links between residential, retail and public areas.
- ❖ Landscaped medians should be integrated into the design of thoroughfares.
- ❖ Mixed use development would allow for walking and biking opportunities.

Other previous Comprehensive Plan chapters—the *Principles & Actions* outlined in Chapter 3, and the land use and livability policies in Chapter 4 and 5 (respectively)—collectively aid in the establishment of the following *Transportation Policies*. These policies represent the culmination of this Transportation Strategy, and provide a framework for the City's future transportation planning efforts.



1. CREATE AESTHETICALLY PLEASING ROADWAYS

- ❖ **Ensure that streetscape enhancements are adopted as part of street engineering standards.** Examples include articulated pedestrian crosswalks, landscaped medians, bulb-outs where there is on-street parking, and street trees. Due to soil conditions in areas west of the BNSF railroad line where soils are impacted by underlying Eagle Ford Shale, precautions should be taken so that growth of street trees do not negatively affect pavement stability.
- ❖ **Adopt the proposed new roadway sections for mixed use and transit-oriented development into the City's *Thoroughfare and Circulation Design Requirements*.**
- ❖ **Incorporate urban design elements such as benches, flowers and shrub planters, trees, lampposts, and public art where walking is desired and encouraged.**
- ❖ **Avoid street improvement solutions that require removal of mature street trees** unless necessary. Refer to Frisco landscaping ordinances for direction.
- ❖ **Alignments for new development or realignments in existing developed areas should be designed to save significant stands of native trees or outstanding specimen trees** whenever possible. Refer to Frisco landscaping ordinances for direction.
- ❖ **Existing neighborhoods should be retrofitted with enhancements** described under this policy whenever physically possible as funds become available.
- ❖ The following guidelines are recommended for thoroughfare landscaping:
 - **Major Thoroughfares** – All Major Thoroughfares with a median should include native landscaping within the median. Median landscaping may include a single row of street trees. For median landscaping to be effective, the roadway should be designed with built-in irrigation in mind. Along the edge of the right-of-way, a row of street trees is suggested on each side will help give a “wall” to the roadway and give the illusion of making the road seem less imposing.
 - **Minor Thoroughfares and Collector Streets** – Minor Thoroughfares and Collector Streets should have a similar landscape treatment as Major Thoroughfares, but without the median landscaping. Street trees on Collector Streets may be a single-row if the right-of-way is not wide enough to accommodate a double row with a sidewalk.
 - **Residential Streets** – Residential Streets may have a similar landscape treatment as Collector Streets, but the trees should be planted at the time of the construction of the homes. Homeowners may augment landscaping within the public right-of-way, but should not obscure sidewalks, driveway visibility, or other similar design requirements, and utilities should not be adversely affected.
 - **Tree Variety & Characteristics** – Frisco prefers a variety of trees, but the variety should not exceed 45 percent of the total number and related types of trees. While there are numerous trees from which to choose, it is suggested that trees with a long life-span and that are hardy for this environment. It is also suggested that landscaping materials include drought-resistant and native materials (xeriscaping).



2. INCREASE THE INTERCONNECTION OF STREETS

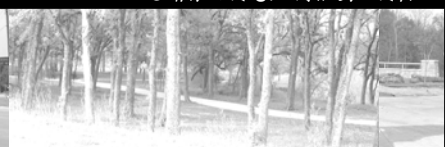
- ❖ **Create connections between major thoroughfares** as they are constructed that establish increased continuity.
- ❖ **Explore opportunities to modify existing street systems** so that they:
 - Offer flexibility of routes and modes of transportation (e.g. hike, bike, transit, automobile);
 - Lessen traffic congestion at intersections; and,
 - Provide shorter walking/biking distances. Shorter vehicle trips and increased pedestrian activity will benefit both public health as well as the environment.
- ❖ **Encourage inclusion of neighborhood services** in retail centers, such as banks, dry cleaners, neighborhood hardware and grocery stores, and a range of dining and entertainment options.
- ❖ **Provide convenient travel for pedestrian and bicycle modes, as well as automobiles.** Elements that can help achieve this include continuous sidewalks, short blocks, and safe pedestrian crossings.
- ❖ **Ensure that bridge structures are designed to accommodate grade-separated hike and bike trails** when major streets cross creeks and flood plains.



Where roadways cross over creeks and flood plains, provisions should be made for grade-separated trails.

3. REDUCE VEHICULAR TRIPS BY OFFERING TRANSPORTATION MODE CHOICES

- ❖ Continually update the long-range Hike and Bike Trail Master Plan.
- ❖ Continue the development of a City-wide, interconnecting trail system.
- ❖ Focus retail, employment, and higher density housing in walkable, mixed-use neighborhoods or in districts capable of facilitating future local and/or regional transit service.
- ❖ Encourage developments which feature mixed uses, commercial streets designed to slow traffic, shorter blocks and continuous sidewalks and trails that reduce the dependency on automobiles and encourages pedestrian activity.





4. DESIGN LOCAL NEIGHBORHOOD STREETS FOR SAFE, LOW SPEEDS

- ❖ **Encourage lower speeds by designing local streets with geometrics that make drivers more aware of their speed.**

Designing neighborhood streets that encourage lower speeds must have geometric elements that force the driver to slow down. Examples of such geometrics include:

- Street width,
- Centerline radii of curves, and
- Intersection turning radii.



- ❖ **Explore the use of traffic calming measures (landscaped medians, roundabouts, neck-downs and others) on new and existing streets, where physically possible.**

- ❖ **Allow on-street parking on local streets where possible.**

- ❖ **Street bumps and/or humps are prohibited in order to avoid associated increases in emergency response times.**



Street designs encourage low speeds.

5. CONTINUE TO WORK WITH STATE AGENCIES

- ❖ **Coordinate with the Texas Department of Transportation and the North Texas Tollway Authority** to optimize access and circulation on the State and Toll Road corridors within the City.
- ❖ **Coordinate with appropriate agencies** in order to gain necessary funding to construct the necessary mobility and capacity improvements that meet the needs for Frisco and the region.



6. ESTABLISH A VIABLE TRANSIT SYSTEM WITHIN THE CITY

- ❖ **Continue to evaluate the effectiveness of the City's current bus system, which is a contract service provided through an agreement with the Collin County Area Rapid Transit (CCART).** Denton County also has a bus system (SPAN), which provides service to Denton County citizens upon request. The City will need to investigate other options in the future as growth occurs to continue to provide efficient transit service.
- ❖ **Encourage retail, employment and higher density housing in the potential areas that are capable of accommodating future rail transit stations.** Specifically, use the *Future Land Use Plan* in conjunction with the proposed transit routes and station locations to help ensure that land development decisions are supportive of such routes and stations.
- ❖ **Utilize the potential routes for future regional transit lines that are identified within this *Transportation Strategy* to connect the City to other areas within the Metroplex.** There are three rail stations currently proposed by the NCTCOG for locations in Frisco. In addition to these, the City should encourage more rail stations in Frisco if possible.
- ❖ **Explore the potential routes for future localized transit lines that are identified within this *Transportation Strategy* to connect the City's major attractions and concentrations of residential and mixed use development with regional transit stations.** Two circular routes, one north of Main Street and one south of Main Street are proposed. These routes and the concepts supporting them are discussed in detail previously within this *Transportation Strategy* (see page 6.32). In short, **a local transit system should:**
 - **Effectively connect various areas of the City,**
 - **Effectively connect the regional rail stations, and**
 - **Be unique in its "look and feel," providing Frisco with a recognizable City element.**
- ❖ **Ensure that forms of transit are consistent with a type that will be used by citizens and visitors.** The results of the Visual Character Survey (VCS) that was conducted during the Visioning process (see Chapter 2) suggest that commuter and light rail and trolleys would be the types of transit that are most attractive to citizens, and therefore would likely be more utilized than a bus service type of transit.
- ❖ **Revise parking requirements in *Transit-Oriented Development* areas.** Parking requirements significantly influences the design/character of buildings and development because of the magnitude of land required for parking lots. Zoning typically requires a substantial amount of space for parked cars, with ratios based on conservative standards and not supported by actual parking demand. As with street design, parking



requirements are applied with a “one size fits all” perspective without regard for the intensity and transit orientation of an area. In suburban areas, ample free parking surrounding employment and shopping centers encourages driving even when high quality transit is available. **Parking requirements should be revised to do the following:**

- **Eliminate parking minimums and/or establish parking maximums to manage overall parking supply,**
- **Develop shared parking requirements and encourage joint use parking agreements between complimentary uses**

Eliminating or reducing parking minimums in districts around transit, and/or establishing maximums reduces the amount of land required for parking, allowing more intensive development. The relative scarcity of parking can discourage the use of the single occupant vehicle. Parking minimums and maximums should only be implemented where there is frequent transit service; at employment centers with effective Transportation Demand Management programs; and at mixed-use development projects with complimentary uses that can share parking.

- ❖ **Relax level of service standards in transit development areas.** Level of service requirements are used to mitigate the traffic impacts of new development and as a method of new development to contribute for capacity improvements. Level of service impacts frequently result in the construction of larger streets and intersections, often with little regard for impacts on alternative modes of travel. Less stringent automobile level of service performance standards in transit corridors and transit oriented development areas allows for the reduction of street width, making streets more pedestrian and transit-friendly. Relaxing level of service requirements in certain areas can enhance walking, bicycling, and transit use, particularly if multimodal improvements are implemented in lieu of increasing vehicular capacity. This policy is based on the premise that some congestion will be accepted in certain areas in order to maintain its walkable character.
- ❖ **Establish a local transit authority and provide a steady funding mechanism.** The NCTCOG’s Regional Rail Corridor Study ranked the “Frisco Line” fairly high on all indicators except the presence of a local transit authority and funding strategy. Designating an existing organization and/or establishing a new governmental body to manage Frisco’s involvement in transit enterprises is critical to success. The City will need to address this issue by performing an in-depth transit feasibility study prior to or in conjunction with establishing a transit authority.

7. UTILIZE TRANSPORTATION SYSTEM MANAGEMENT (TSM) STRATEGIES TO IMPROVE MOBILITY

- ❖ **Use Intelligent Transportation Systems (ITS) in order to improve incident management.**
- ❖ **Evaluate traffic signal timing for congested intersections.**



- ❖ **Evaluate geometric characteristics, signing and striping** to determine potential improvement for congested intersections.
- ❖ **Implement higher access management standards to control access along several major corridors in the City.** For instance, the Dallas North Tollway, SH 121, US 380, and Preston Road are examples of major transportation corridors that deserve a higher degree of access control. These facilities should seek to exceed the City's minimum access requirements as they form the backbone for automobile travel in the City.

8. IMPLEMENT TRANSPORTATION DEMAND MANAGEMENT (TDM) TECHNIQUES TO REDUCE TRAFFIC DEMAND

- ❖ **Encourage employers to subsidize transit for employees.**
- ❖ **Promote ridesharing** through exclusive "car pool only" parking spaces.
- ❖ **Encourage employer-coordinated flexible work schedules.**
- ❖ **Provide bicycle and pedestrian information to businesses,** so that they can inform employees.
- ❖ **Promote tele-working** for both employers and residents.
- ❖ **Promote tele-centers** with wireless fidelity (wi-fi) "hot spots."
- ❖ **Continue to promote the use of alternative fuel vehicles** by purchasing and using such vehicles for City purposes, such as for operation and maintenance vehicles for City workers.

